Green Power Market and Data Issues

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Definitions

- ***Green Power***
  - No legal definition.
  - Accepted definition: an electricity product with a high fraction of renewable energy content — most products are, in fact, 100% renewable energy.
  - Issue of "new" versus "existing" renewables
- ***Green Power Marketing***
  - The act of selling green power, generally used to describe competitive marketing (retail and wholesale).
- ***Green Pricing***
  - Green power programs or tariffs offered by utilities.
- ***Renewable Energy Certificates***
  - Separation of the renewable energy attributes from the physical electricity product.

Utility Green Pricing Programs

- More than 350 utilities in 33 states have announced or implemented green pricing programs.
- The top programs are achieving 3% to 6% customer participation, but average participation is around 1%.
- Product quality and marketing commitments vary widely.
- Some states require utilities to offer a green pricing option.
- 271,000 green pricing customers at the end of 2002.*

*75% utility response rate

Competitive Retail Markets

- ***Green power marketing***
  - Consumers can choose from several potential offers.
  - Customers must switch to an alternative provider.
  - Customers pay a rate which is typically higher than for system power.
- Green power being marketed in 8 states; once upon a time there were 24 states that had passed restructuring legislation.
- By and large, robust competition has not materialized.
  - No competition, no switching, no green power.
- Some states are beginning to require default service providers to offer a green power option.
- 150,000 customers estimated to be purchasing green power in competitive markets.

Renewable Energy Certificates

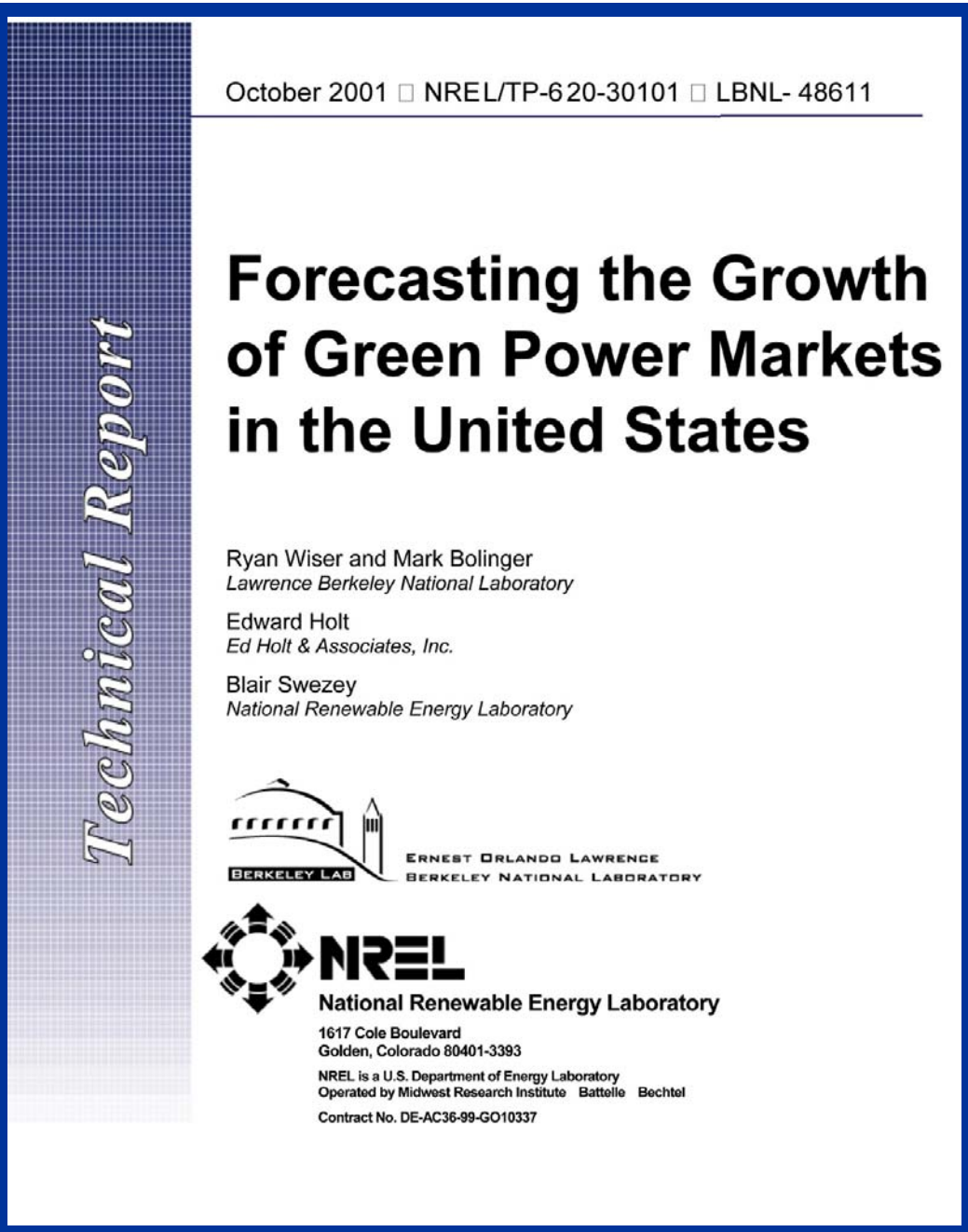
- RECs are used for both regulatory compliance and voluntary green power markets.
- Within green power markets, RECs can be sold at wholesale, used in the retail products of utilities and marketers, or sold as dedicated retail products.
- Certificates can lower transaction costs for green power but, in some cases, may not reflect the local or regional values of renewable power generation.
- Primary retail customers for RECs have been businesses and other large non-residential customers.

New Renewables Capacity Supplying Green Power Markets (2002)

Source	MW in Place	%	MW Planned	%
Wind	913.3	93.0	302.0	70.0
Biomass	45.1	4.6	76.1	17.6
Solar	4.8	0.5	1.4	0.3
Geothermal	10.5	1.1	49.9	11.6
Small Hydro	8.6	0.9	2.0	0.5
Total	*982.3*	*100.0*	*431.4*	*100.0*

Green Power Data Issues

- No comprehensive source exists for green power data.
- Green pricing
  - Annual NREL questionnaire (geared to "Top 10" lists)
    - Green power sold
    - New capacity installed or planned
    - # of customers participating (residential/non-residential)
  - 75% response rate for utility programs in 2002
- Green power marketing
  - Telephone inquiries; press accounts
  - CRS annual audit (only covers *Green-e* certified suppliers)
- Renewable energy certificates
  - Telephone inquiries; press accounts



http://www.eere.energy.gov/greenpower/pdf/30101.pdf

Study Purpose

- Introduction of customer choice in domestic electricity markets provides a new but untested approach to increasing renewable energy development.
- Quantify the potential size and impact of the green power market.

Study Approach

- Review green power market research and marketing experience.
- Identify variables that will help determine market size and the rate of market development.
- Examine the experiences of other industries that have undergone "deregulation" or that sell products with a high degree of environmental or health-related content.
- Develop a model to forecast green power market growth based on incorporated assumptions.

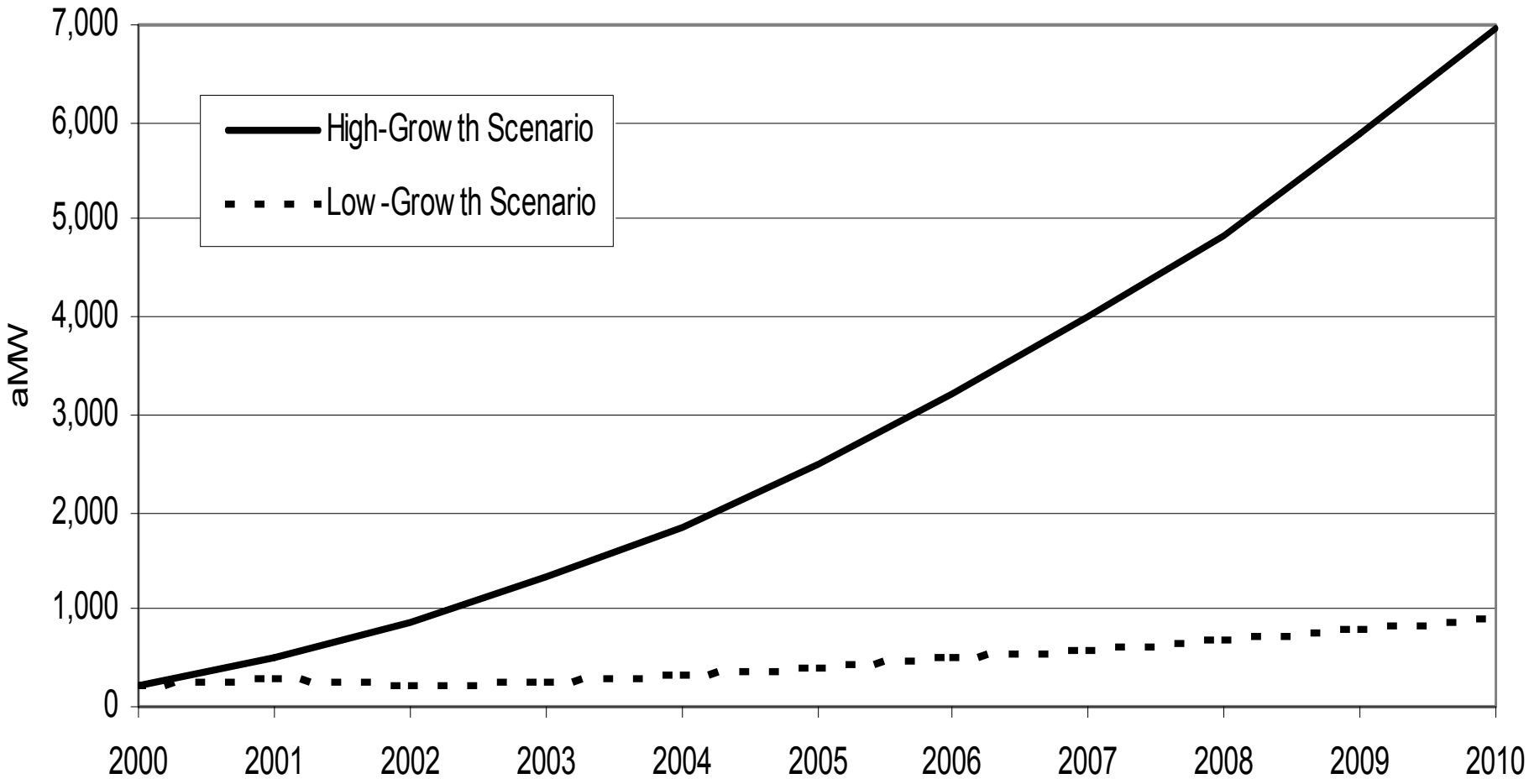
Green Power Forecast

- 10-year forecast of U.S. green power demand
- High growth scenario
  - restructuring proceeds with little delay
  - market rules conducive to competition (switching)
  - consumer acceptance of green power is high
  - green power premium continues to decline
- Low growth scenario
  - introduction of customer choice is delayed
  - market rules deter competition, switching
  - consumer acceptance of green power grows slowly
  - green power premium remains at current levels
- Both scenarios are plausible

Forecast Inputs

- State level forecast of residential loads to 2020
- Pace of restructuring, by state
- Green power market access, by state
- Separate assumptions for regulated and restructured markets
- Residential green power market penetration
- Non-residential demand as percent of residential demand
- Green power product quality
  - % total renewable
  - % *new* renewable
- Start with known conditions

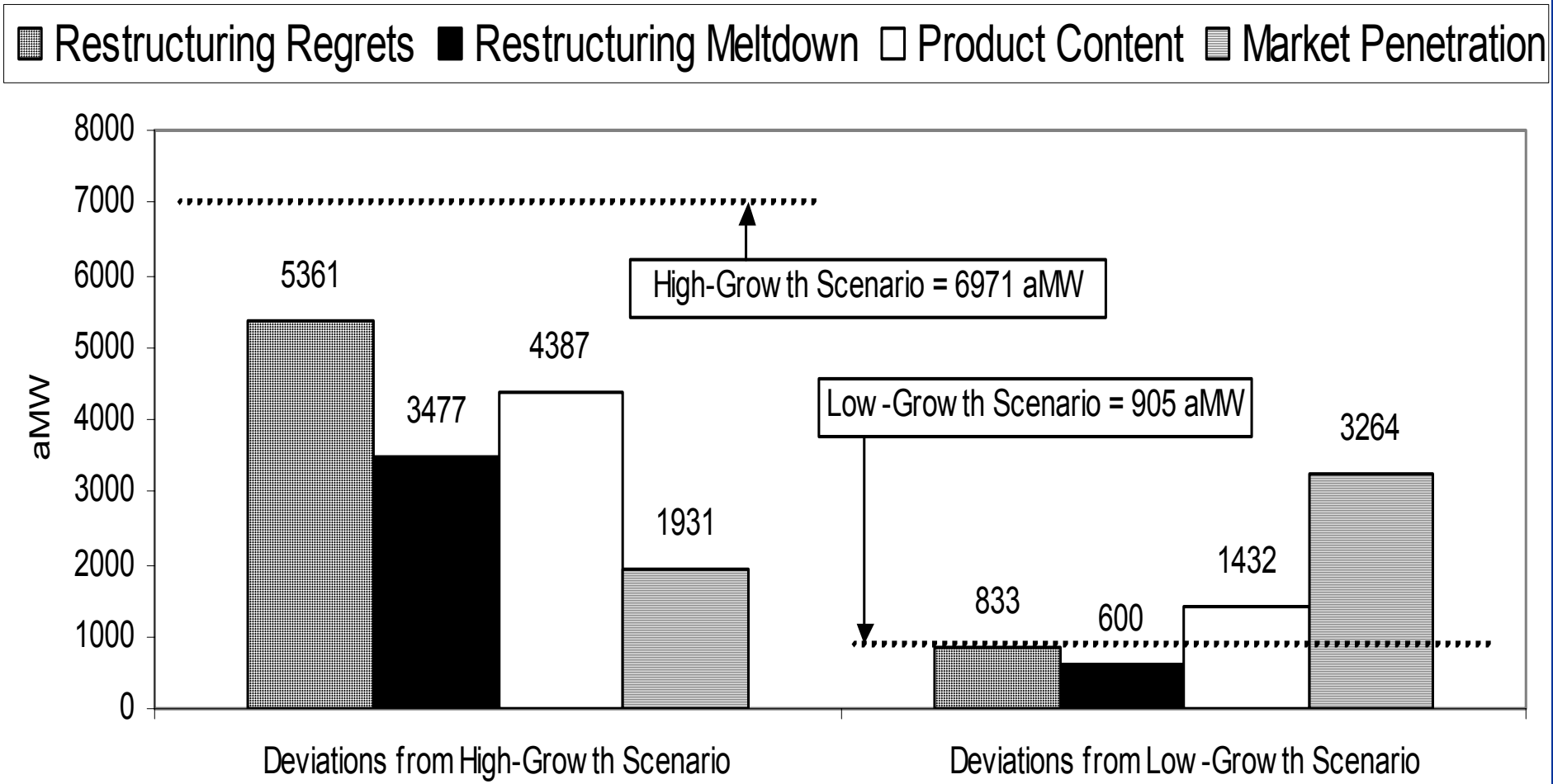
Results
Renewable Energy Capacity Supported by Green Power Demand



Key Sensitivities

- Pace of Restructuring and Green Power Access
- Green Power Product Content
- Green Power Penetration Rates

Sensitivity Scenarios



Key Market Determining Factors

- Customers must have widespread access to aggressively marketed green power products, whether in restructured or regulated markets.
  - Currently, less than 50% have access from their retail provider
  - The leading utility programs have achieved participation rates of 3% to 6%, but more than half are at <1%.
- Widespread customer education is needed on the merits of exercising green product choice.
- Green power premiums must be reduced.
- Innovation in green power products and marketing strategies would likely increase the pace of market development.

Key Market Determining Factors (Cont.)

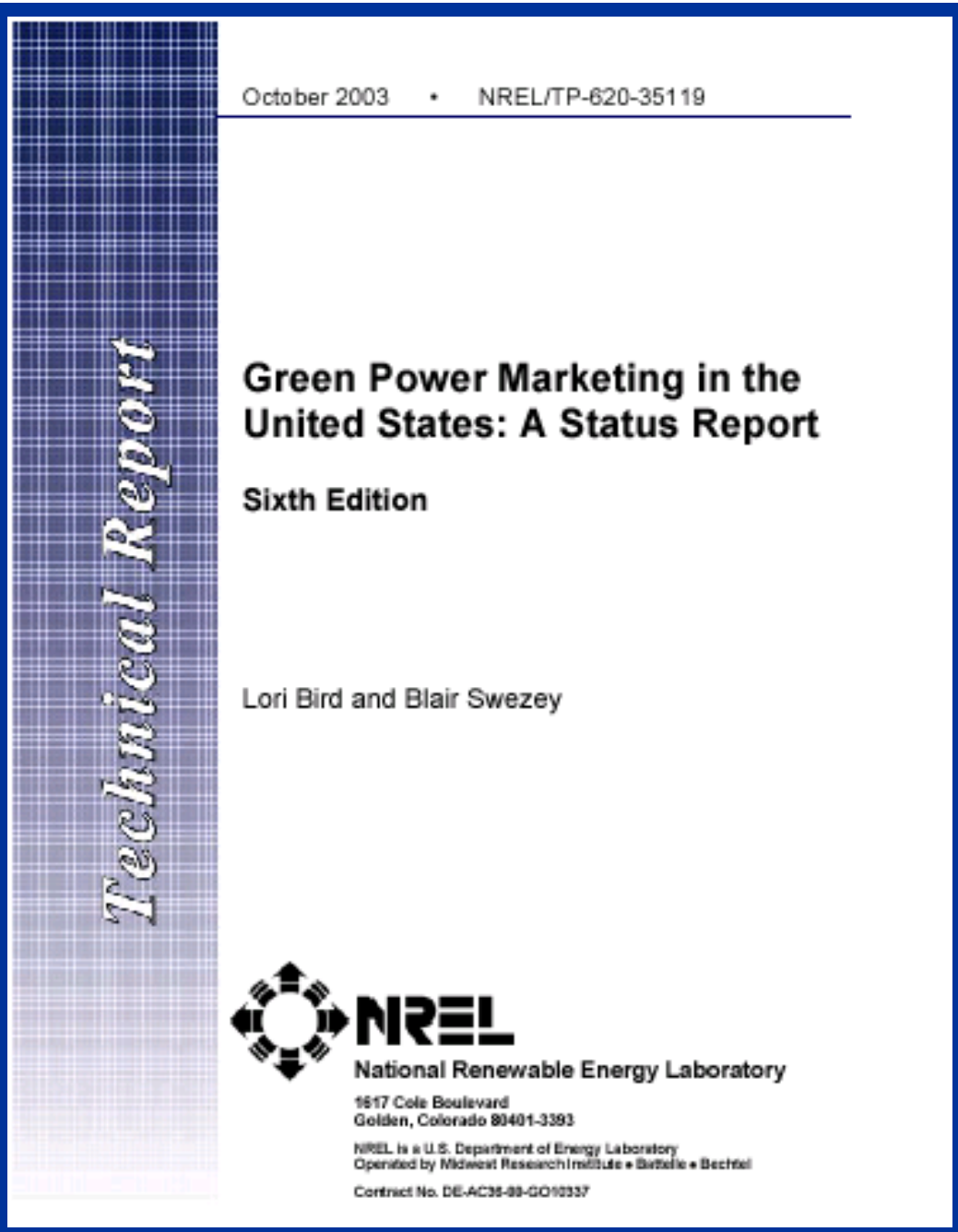
- Public policy measures can directly or indirectly assist the market
  - Direct measures
    - Green pricing requirements
    - Customer incentives for green power purchases
    - Grants to green power marketers and aggregators
    - Education and marketing campaigns
  - Indirect measures
    - Tax incentives and grants that reduce the cost of renewable energy generation

Emerging Opportunities Identified

- Customer Aggregation
- Large Customer Demand
- Renewable Energy Certificates

Closing Comments

- No explicit modeling of consumer preferences in the forecast.
- If large majorities of customers say they are willing to pay more for green power, why don't they purchase a green power product?
  - Price
  - Product quality
  - Value proposition
  - Awareness
- How do you address the differences in program success?
  - Some utility programs achieve customer participation rates of >5%, but many others <1%.



www.eere.energy.gov/greenpower/pdf/35119.pdf

The U.S. Department of Energy's *Green Power Network* provides news and information on green power markets and utility green pricing programs. You will find links to green power providers and product offerings, and information on consumer and policy issues that impact the development of green power markets.

http://www.eere.energy.gov/greenpower